

THE MINERAL INDUSTRY OF IRELAND

By Harold R. Newman

Ireland remained a major European Union (EU) producer of lead and zinc and an important producer of alumina and peat in 2004 (table 1). Zinc production was centered on Anglo American plc's Lisheen lead-zinc mine, Arcon International Resources plc's Galmoy lead-zinc mine, and Outokumpu Oyj's Tara lead-zinc mine; these were three of Europe's most modern mines. Ireland was also one of the leading exporters of lead and zinc. The country's mineral-processing industry was small as was the demand for and consumption of mineral products (table 2).

Ireland has a land area of 70,280 square kilometers (km²). It is bounded by Northern Ireland to the northeast, the Irish Sea to the east, and the Atlantic Ocean to the west. In 2004, the gross domestic product (GDP) based on purchasing power parity was \$152 billion, and the per capita GDP based on purchasing power parity was \$37,663. The unemployment rate was estimated to be 4.5%, and the annual inflation was about 2.3% (International Monetary Fund, 2005¹).

Environmental issues included air quality owing to emissions from road traffic and water pollution, especially of lakes, from agricultural runoff. Increased waste generation was expected to continue to cause problems. Ireland's greenhouse gas emissions were still the highest per capita in the EU (Alexander's Gas & Oil Connections, 2004§).

Ireland's geology includes several lithological units and tectonic features that are favorable for the occurrence of several types of mineral resources from base metals to industrial minerals. The five key rock types are Connemara marble, which is a metamorphic rock formed from limestone; granite from various geologic ages, mostly 400 million years; Devonian sandstones, including Old Red Sandstone; Carboniferous rock, which is the main surface rock of Ireland and covers more than 50% of the country; and Tertiary basalt. The most famous outcrop is The Giant's Causeway, which consists of columnar basalt of volcanic origin (National University of Ireland, 2004§).

The main focus for exploration and development of Ireland's lead-zinc deposits was the Carboniferous rock of the Midlands region. The mineralization, which is similar to that of Mississippi Valley-type deposits in the United States, is hosted in strata-bound carbonate units.

The Department of Communications, Marine and Natural Resources provided technical assistance to exploration and mining companies. The Geological Survey of Ireland (GSI) was the national earth science agency and was responsible for providing geologic advice and information and acquiring data for this purpose. The GSI has conducted many projects of interest to the mineral industry. The GSI produced a range of products that included maps, reports, and databases. It functions as a line division of the Department of Communications, Marine and Natural Resources.

Aughinish Alumina plc began work on its natural gas-fired powerplant. The 150-megawatt (MW) plant was expected to cost about \$120 million and be completed by yearend 2005. Aughinish would need an estimated 40 MW for its 1.5-million-metric-ton-per-year (Mt/yr) operation; the remaining energy would be fed into the Irish national grid (Metal Bulletin, 2004a).

Aughinish further announced that it would invest \$200 million to increase the capacity of its alumina plant from 1.5 Mt/yr to 2 Mt/yr. The plant produced alumina by treating reddish-brown bauxite ore by the Bayer process to produce a fine white granular powder. Most of the bauxite ore supplied to Aughinish came from the Republic of Guinea. The additional 0.5 Mt/yr alumina production would be sold to its regular customers and on the spot market (Metal Bulletin, 2004b).

Conroy Diamonds and Gold plc announced the discovery of a high-grade mineralized area in bedrock at its Glenish gold prospect, which is located approximately 7 kilometers (km) southwest of the company's Tullybuck-Lisglassen deposit. Results included a 1-meter channel sample grading 9.4 grams per metric ton (g/t) gold with values of up to 2.4 g/t gold in grab samples (Conroy Diamonds and Gold plc, 2004§).

Asarco Exploration Company Inc. undertook an extensive technical review of its ground holding in Ireland. The holding covered an area of 555 km² and was divided into five license blocks located in Cos. Kildare, Laois, Limerick, Offaly, and Tipperary. These blocks host dolomitized Waulsortian Limestone Complex lithologies similar to those of the Galmoy and Lisheen lead-zinc ore bodies. Asarco sought joint-venture partners for exploration and possible development of their blocks (Geological Survey of Ireland, 2005§).

Minco plc started a joint-venture diamond drilling project on Minco's Pallas Green zinc-lead project in Co. Limerick with Noranda Inc. of Canada. Previous drilling over the 300-km² area identified a number of massive sulfide zones of zinc and lead mineralization along the Pallas-Limerick Alteration Trend, which lies 45 km west of the Lisheen Mine. The drill program was designed to further define massive sulfide mineralization zones and to test new areas (Minco plc, 2004§).

Anglo American plc's Lisheen Mine awarded a major supply contract for environmentally friendly cement to Ecocem plc, which operates Ireland's first pollution-free cement manufacturing facility in Dublin. Lisheen, which was one of Europe's leading zinc and lead mining operation, will use up to 120,000 metric tons (t) of waste material over the 4-year term of the contract to backfill and seal mining tunnels with high-density tailings. The move was expected to lead to the elimination of up to 120,000 t of carbon dioxide emissions to the atmosphere (Business World, 2004§).

Historically, Ireland has not been a very successful location for natural gas and petroleum exploration. Activity has been hindered by the lack of success and by high cost. The Seven Heads gasfield offshore could have less reserves than was expected and was subject to production problems. The field was brought onstream in December 2003 by Ramco Energy plc and was expected to produce 1.7 million cubic meters per day. Well-head pressures and, subsequently, flow problems caused production to fall to 1.1

¹References that include a section mark (§) are found in the Internet References Cited section.

million cubic meters per day. Tests suggested that each well was connected to a lower volume of reserves than had been expected (Petroleum Economist, 2004).

Outlook

GSI will continue to be responsible for the development of minerals information and for the technical management of the state mineral licensing and leasing system. Ireland will remain a major EU producer of zinc and an important producer of alumina and lead. Exploration activity for additional new mineral resources, mainly emphasizing gold, lead, and zinc, will continue to increase.

References Cited

Metal Bulletin, 2004a, Aughinish Alumina to begin work on power plant: Metal Bulletin, January 26, p. 20.
Metal Bulletin, 2004b, Glencore's Aughinish alumina plant to reach 2 million tpy: Metal Bulletin, June 28, p. 10.
Petroleum Economist, 2004, Problems at the Seven Heads gasfield: Petroleum Economist, vol. 71, no. 4, April, p. 38.

Internet References Cited

Alexander's Gas & Oil Connections, 2004 (June 2), Ireland's greenhouse gas emissions highest in EU, accessed August 1, 2005, at URL <http://www.gasandoil.com/goc/news/n42275.htm>.
Business World, 2004 (September 24), Lisheen awards major contract to Ecocem, accessed September 24, 2004, at URL http://www.businessworld.ie/cgi-bin/printer_friendly?a=1006779.
Conroy Diamonds and Gold plc, 2004 (October), Conroy makes new high-grade bedrock gold discovery, accessed April 4, 2005, at URL http://www.conroydiamondsandgold.com/news_5oct-04.htm.
Geological Survey of Ireland, 2005 (May), Industry news, accessed August 18, 2005, at URL <http://www.minex.ie/Industry+News+May+2005.htm>.
International Monetary Fund, 2005 (April), Ireland, World Economic Outlook Database, accessed July 29, 2005, via URL <http://www.imf.org/external/pubs/ft/weo/2005/01/data/dbcoutm.cfm>.
Minco plc, 2004 (July), Minco commences drill program on Pallas Green joint venture, accessed September 4, 2004, at URL <http://www.minco.ie/mn080704.htm>.
National University of Ireland, 2004, Elements of the geography of Ireland, accessed August 1, 2005, at URL http://www.nuigal.ie/geography/T1104_Geologynotes.htm.

Major Sources of Information

Department of Communication, Marine and Natural Resources
29-31 Adelaide Road
Dublin 2, Ireland
Geological Survey of Ireland
Beggars Bush, Haddington Rd.
Dublin 4, Ireland

TABLE 1
IRELAND: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity	2000	2001	2002	2003	2004 ^e
METALS					
Alumina ^c	1,300	1,400	1,200	1,200	1,200
Iron and steel, steel, crude	342	110	--	--	--
Lead:					
Mine output, Pb content metric tons	57,825	44,518	32,486	50,339	65,915 ²
Metal, refined, secondary ^c do.	9,000	9,800	6,600	6,600	6,600
Silver, mine output, Ag content kilograms	25,100	19,300 ^r	5,000 ^r	20,400	20,400
Zinc, mine output, Zn content metric tons	262,877	225,135	252,700	419,041 ^r	444,127 ²
INDUSTRIAL MINERALS³					
Cement, hydraulic ^c	2,620 ²	2,500	2,500	2,500	2,500
Gypsum ^c	450	500	500	500	500
Lime ^c metric tons	100,000	100,000	300,000	300,000	300,000
Nitrogen, N content of ammonia	410	443	300 ^r	300 ^r	300
Sand and gravel ^{c,4}	12,000	12,000	12,000	12,000	12,000
Stone and other quarry products:^c					
Limestone million metric tons	1	1	1	1	1
Other ⁵ metric tons	35,000	36,000	36,000	36,000	36,000
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural, marketed ^c million cubic meters	2,500	2,500	2,500	2,500	2,500
Peat:⁶					
For horticultural use	325 ^r	300 ^r	350 ^r	451 ^r	400
For fuel use, milled peat ⁷	5,378 ^r	4,599 ^r	4,138 ^r	2,739 ^r	5,200
Total	5,703 ^r	4,899 ^r	4,488 ^r	3,190 ^r	5,600
Briquets	317 ^r	248 ^r	268 ^r	269 ^r	284 ²
Petroleum refinery products:^{c,8}					
Liquefied petroleum gas thousand 42-gallon barrels	545 ²	500	500	500	500
Naphtha do.	884 ²	900	900	900	900
Gasoline, motor do.	4,556 ²	4,500	4,500	4,500	4,500
Distillate fuel oil do.	8,415 ²	8,000	8,000	8,000	8,000
Residual fuel oil do.	7,639 ²	7,000	7,000	7,000	7,000
Refinery fuel and losses do.	77 ²	75	75	75	75
Total do.	22,116 ²	21,000	21,000	21,000	21,000

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. -- Zero.

¹Table includes data available through May 2005.

²Reported figure.

³Ireland also produces significant quantities of synthetic diamond and is the major supplier to the United States. Output, however, is not quantitatively reported, and general information is inadequate to make reliable estimates of output levels.

⁴Excludes output by local authorities and road contractors.

⁵Includes clays for cement production, fire clay, granite, marble, rock sand, silica rock, and slate.

⁶Includes production by farmers and by the Bord Na Mona (Government Peat Board).

⁷Includes milled peat used for briquet production.

⁸From imported crude oil.

TABLE 2
IRELAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facility	Annual capacity
Alumina		Aughinish Alumina plc (Glencore International AG)	Aughinish Island, County Limerick	1,500
Cement		Irish Cement Ltd.	Plants in Limerick and Platin	2,000
Lead-zinc, concentrate		Anglo American plc	Lisheen Mine, County Kilkenny	160
Do.		Arcon International Resources plc	Galmoy Mine, County Kilkenny	135
Do.		Outokumpu Oyj	Tara Mine, Navan, County Meath	215
Natural gas	million cubic feet	Marathon Oil Corp.	Kinsale Head Field, Celtic Sea	75,000
Nitrogen, N content of ammonia		Irish Fertilizer Industries	Plant at Marino Point	450
Peat		Bord Na Mona (Government Peat Board)	Production mainly in the Midlands	4,200
Petroleum, refined	42-gallon barrels per day	Irish National Petroleum Corp. Ltd. (Tosco Corp., 100%)	Whitegate, near Cork	75,000
Steel		Irish Ispat (Ispat International NV)	Haulbowline, near Cork (closed)	500